RESPONSE

Applicants, through their attorney, respectfully request the Examiner to consider the application in view of the included remarks.

Support

Applicants have amended the claims to method claims. Claims 1 to 9 and 17 are now claims directed to a method of operating an internal combustion engine. Support for these amendments is found on page 4, lines 5 to 13 of the specification.

Applicants have cancelled claims 10 to 13, 18 and 19.

Applicants have added new claims 20 to 25. Claim 20 specifies the conventional polyisobutylene (PIB) is made with an $AlCl_3$ catalyst and has an alpha- and/or beta-vinylidene double bond isomer content of 30 mole percent or less while the high vinylidene PIB is made using a BF_3 catalyst and has an alpha- and/or beta-vinylidene double bond isomer content of 80 mole percent or more. Support for this claim is found on page 5, line 3 to page 6, line 9 of the specification. Claims 21 and 22 specify that the ratio of conventional to high vinylidene PIB is from 10:90 to 40:60 on a weight basis and that the Mannich additive is present in the fuel from 10 to 1,000 ppm. Support for these claims is found on page 7, lines 2 to 3 and page 12, lines 26 to 27 of the specification. Claims 23 to 25 specify that the amine is a secondary monoamine containing from 0 to 22 carbon atoms, an alkylenediamine containing more than 2 carbon atoms, or a mixture thereof; and that the aldehyde comprises a aliphatic aldehyde. Support for these claims is found on page 9, lines 8 to 28 of the specification.

Applicants have added new claims 26 to 32 directed a method of making the Mannich additive of claim 1. Claim 26 corresponds to claim 1. Claims 27 corresponds to claim 20. Claims 28 and 29 correspond to claims 22 and 23. Claims 30, 31 and 32 correspond to claims 23, 24 and 25. Support for these claims is found on page 4, lines 18 to 21 of the specification as well as the passages cited above for claims 20 to 25.

No other elements of the claims have been amended.

Response

The Examiner rejected claims 1-13 and 17-19 under 35 U.S.C. 103(a) as being unpatentable over Carabell (US 2003/0172582). The Examiner continues to read Carabell as teaching Mannich fuel additives derived from polyisobutylenes (PIB) that,

among other embodiments, may have a methylvinylidene isomer content of at least 20%. The Examiner concludes that this teaching in Carabell at least makes obvious the features of the present invention specifying a mixture of conventional PIB and high vinylidene PIB. The Examiner has not been persuaded by Applicant arguments and evidence that shows conventional PIB and high vinylidene PIB are substantially different materials and that Carabell provides no teaching of conventional PIB let alone the combination of conventional PIB and high vinylidene PIB in the preparation of a Mannich additive.

The Examiner responds in the present office action that Carabell, in [0057] teaches various mixtures of PIB, including ULTRAVIS 10 which the Examiner contends contains PIB and HV PIB.

Applicants continue to disagree with the Examiner on this point, however with the claims now directed at methods of operating an engine and methods of preparing an additive, the rejection is moot. Carabell does not teach the presently claims methods that use mixtures of conventional and HV PIB. Rather Carabell teaches additives derived from HV PIB. While it is true that HV PIB contains a certain minimum amount of polyisobutylene molecules containing the vinylidene double bond isomer and that the rest of the polyisobutylene molecules do not contain the double bond isomer, it is not equivalent to a mixture of conventional PIB and HV PIB, as demonstrated by the journal article previously submitted and the data in the specification. For example, ULTRAVIS 10, which is mentioned in the reference and which the Examiner appears to consider to be a mixture of conventional PIB and HV, is actually HV PIB. ULTRAVIS 10 is prepared using a BF_3 catalyst and contains no conventional PIB derived from an $AlCl_3$ catalyst (see US 7491248 and US 6875897, which both mention ULTRAVIS 10 in their sections on HV PIB; US 6875897 in particular discusses the difference between HV and conventional PIB). It is not possible to prepare a material that would be considered to be an HV PIB using the BF_3 catalyst used to prepare ULTRAVIS 10

Therefore, as the claims are now directed to methods utilizing additives derived from a mixture of conventional PIB and HV PIB, claims 1 and 26, as well as all claims that depend on them, are both novel and non-obvious over the reference and should be allowed.

If the Examiner feels these arguments would be more persuasive if the claims specified the methods by which each PIB was made, Applicants direct the Examiner to claims 20 and 27.

Furthermore, claims 20 and 27 also specify that the conventional PIB has an alpha- and/or beta-vinylidene double bond isomer content of 30 mole percent or less; and that the high vinylidene PIB has an alpha- and/or beta-vinylidene double bond isomer content of 80 mole percent or more. Even if Carabell does provide some teaching of mixtures of conventional PIB and high vinylidene PIB it does not teach a mixture that meets the limitations of the these claims.

Therefore, claims 20 and 27 are both novel and non-obvious over the reference and should be allowed.

In the alternative, claims 21, 22, 28 and 29 specify that the ratio of conventional PIB to high vinylidene PIB is from 10:90 to 40:60 on a weight basis and wherein the Mannich additive is present in the fuel composition from 10 to 1,000 ppm. Even if Carabell does provide some teaching of mixtures of conventional PIB and high vinylidene PIB it does not teach a mixture that meets the limitations of the these claims.

Therefore, claims 21, 22, 28 and 29 are both novel and non-obvious over the reference and should be allowed.

Finally, the Examiner appears to concede Applicants results show a surprising result over the teaching so Carabell but finds that the data in the specification is not commensurate in scope with the claims. The Examiner provided several suggestions to bring the claims into the proper scope including: (i) claiming methods of using the described fuel compositions instead of the compositions themselves; (ii) specifying amounts of the components in the claims; and (iii) further specifying the Mannich condensates covered by the claims.

The claims outlined above address all of the Examiner's suggestions except item (iii). Claims 1 and 26, and the claims that depend on them, are method claims. Claims 21, 22, 28 and 29 specify the amount of Mannich in the fuel while claims 20 to 22 and 27 to 29 specify the conventional and HV PIB mixtures in various ways. Finally, claims 23 to 25 and 30 to 32 specify the amine and aldehyde used with conventional and

HV PIB mixtures to prepare the Mannich additive, thus address all of the Examiner's points.

Thus, even if the Examiner finds the arguments above are not persuasive, Applicants respectfully submit that at least claims 23 to 25 and 30 to 32 are novel and nonobvious over Carabell.

Conclusion.

For the foregoing reasons it is submitted that the present claims are novel and non-obvious, and in condition for allowance. The foregoing remarks are believed to be a full and complete response to the outstanding office action. Therefore an early and favorable reconsideration is respectfully requested. If the Examiner believes that only minor issues remain to be resolved, a telephone call to the Undersigned is suggested.

Any required fees or any deficiency or overpayment in fees should be charged or credited to deposit account 12-2275 (The Lubrizol Corporation).

Respectfully submitted,

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